



CIRM Shared Research Laboratory Information Form – Part Two

Section A. Project Information

Project Title

Limited to 300 Characters

Project Start Date Construction Start Date Occupancy Date

Total Part Two Funds Requested for Shared Laboratory Space

Total Part Two Funds Requested for Stem Cell Techniques Course

Total Capital Funds Requested

Note: All green fields are calculated values. Do not enter a value in the field.

Please indicate whether you propose to apply for funding of a Stem Cell Techniques Course along with the Shared Laboratory Space, or just the Shared Laboratory Space.

- ☒ Shared Research Laboratory only ☐ Shared Research Laboratory and Stem Cell Techniques Course

NOTE: Please be aware that any information you provide in this form will be made publicly available.

Section A. 1. Program Director

Name	Dr.	Karl	Heinrich	Willert	
	Prefix	First	Middle	Last	Suffix
Email (office)	kwillert@ucsd.edu			This email address identifies you to CIRM. Please use this email address for all correspondence with CIRM.	
Application Number	CL1-00522-1			This field should fill automatically, based on the email address. If not, enter the number you received via email from CIRM, in the form "XX9-99999-9", where "X" is a letter, and "9" is a digit.	

Section A. 2. Facilities Contact

Name	Dr.	Jennifer	B.	Braswell	
	Prefix	First	Middle	Last	Suffix
Institution	University of California, San Diego				If your institution is not listed, please identify the name of the institution here.
Other Institution					
Position Title	UCSD Stem Cell Program Administrator				
Department	School of Medicine Dean's Office Stem Cell Program				
Address	9500 Gilman Drive, 0695				
City	La Jolla			CA	Zip Code 92093-0695
Phone Number	(858) 534-2412		Ext	Fax Number (858) 822-3249	
Email (office)	jbraswell@ucsd.edu			This email address identifies you to CIRM. Please use this email address for all correspondence with CIRM.	



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Section A. 3. Public Abstract

See Appendix A.

Section A. 4. Statement of Benefit to California

See Appendix A.



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Section B. Laboratory Renovation Plan

Project Manager	Pnina Goldberg	Construction Supervisor	To be determined
Title	Principle Architect	Title	at receipt of bids
Company/Institution	UCSD	Company/Institution	tbd

Describe plans for development/renovation of the shared laboratory space including fixed equipment costs. Include a description of the current space and how it will be renovated and reconfigured to form the laboratory. Include as attachments one 11x17 page of the current floor plan space and one 11x17 page of proposed floor plan of the renovated space. Describe all renovations that will be done. Describe how the project will be managed and tracked, as well as how change orders will be handled. For laboratories that are proposed to be located in leased space, provide information regarding the institution's long-term access to the leased space. Describe plans and schedule for all phases of development including design, construction, and installation of equipment leading to a functional laboratory. Give a proposed contingency plan in case of cost overruns. Any additional costs due to budget overruns will be the responsibility of the grant recipient. (narrative limited to 3 pages)

1. General orientation to renovations:

Meeting our scientific objectives requires renovation in two buildings, Cellular and Molecular Medicine East (CMME) and Engineering Building Unit 1 (EBU 1). CMME is the location of the Human Embryonic Stem Cell Core Facility (HESCCF), which requires expansion and renovation to meet the needs of the UCSD scientific community and its neighboring institutes of the San Diego Consortium for Regenerative Medicine (SDCRM). The HESCCF is the centerpiece of the UCSD Stem Cell Program labs, with total useable laboratory space of greater than 12,000 ASF. The HESCCF is presently operational and has served as the site for multiple hESC training classes (course CMM-251) and has supported the research studies of 11 UCSD investigators. Expansion and renovation of this laboratory is essential to meet the growing needs of investigators who are conducting pilot studies or have been awarded CIRM SEED and Comprehensive research grants. In addition, a satellite lab located in EBU1 of the Jacobs School of Engineering will be established to expand capabilities and develop new technologies. The close proximity of these two sites combined with the highly interactive and collaborative environment that exists among UCSD scientists will allow the timely realization of the scientific goals. The proposed development of two sites at UCSD will create a highly interactive and multi-disciplinary environment thus accelerating the rate of scientific discovery and translation to therapeutic application. Technologies and tools developed at one site will complement activities at the other site. For example, genetically modified cell lines developed in the HESCCF in CMME will be used for tissue engineering applications in the satellite lab of EBU1, and conversely, materials and bioreactors designed in engineering will be immediately available for further exploration at CMME.

2. Specifics of Renovation in CMME:

The present configuration of laboratory space is sufficient for up to 3 scientists working simultaneously (based on biosafety cabinet availability). Renovation in CMME will expand the HESCCF to the south and make better use of existing interior space by reconfiguring 2263 square feet to provide space and resources for an additional 3 scientists. The reconfiguration of space coupled with time and resource management as outlined in Part I will expand capabilities to accommodate a total of up to 20 scientists. The space will be transformed to create two lab areas: one for cell culture, and one for cellular and molecular biology technologies. Both necessitate the installation of expensive and large equipment, some of which has already been acquired with funding from private foundations and some of which is requested in this grant application. These two lab areas will be secured by expansion of the automated security system so that three doors can be accessed by magnetic cards that record user, date and time of passage. Within the HESCCF the two labs will be interconnected.

a. CELL CULTURE LAB (rooms 2020E-H): This lab area is supplied by a separate air system which provides high quality clean air essential to maintain a sterile environment. This air system is already established and requires no additions. The lab is accessed by magnetic card through an anteroom that will be constructed with doors sufficiently large to allow for large equipment (e.g., biosafety cabinets, incubators) to be moved in and out. Renovation of 2020E-H will include the removal of an antiquated autoclave and oven and a separating wall to open the space and make more room for equipment. A wall presently separating 2020E from 2020D will be moved by 10 feet. Once renovated, 2020E (450 ASF) will be equipped with two 6 ft biosafety cabinets, six CO2 incubators, a robotic liquid handler (Hamilton Star with integrated incubation) and refrigerator and freezer; all this equipment is already present in the HESCCF. This room will also be modified to include a sink for which the plumbing is already established (presently an emergency eye-wash). From this main room, 2020E, three rooms of 100, 108, and 113 ASF will be renovated and equipped as follows: 2020F will be renovated to include shelving and cabinetry and will be equipped with an electrophysiology set-up (requested in this grant); 2020G will be renovated to include shelving and will be equipped with a micromanipulation set-up, a 4 ft biosafety cabinet and low oxygen incubation (all previously acquired with private foundation funding); and 2020H will be renovated to include a lab bench and shelving and will be equipped with a 4ft biosafety cabinet, a



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Section B -- 1. Laboratory Renovation Plan (continued)

microcentrifuge, an Amaxa Nucleofector (these three items are requested in this grant), two CO2 incubators, an inverted fluorescence microscope, and a floor centrifuge.

b. CELL AND MOLECULAR BIOLOGY LAB (2020A-D and additional room 2013): This lab area will have three access doors, all secured by card key access, and will be connected to the cell culture lab via an anteroom. The wall presently separating 2020 E from D will be shifted by 10 ft to make more space in this lab area. Two fixed lab benches will be removed and replaced with movable heavy duty lab benches necessary to support large equipment and associated computers. Power supplies and network connections will be mounted above these movable benches. We request funding for a FACS Aria, a cell sorter essential for analysis of cell differentiation, that will be installed in this space. Additional previously acquired equipment to be located on these benches includes: an automated microscope (Cellomics ArrayScan Vti), a multimode plate reader (Perkin Elmer Envision), and a real-time qPCR machine (ABI 7900). Two bays, 2020A and B for general lab work (molecular biology and biochemistry), will remain without modifications and will be equipped with a thermal cycler, microcentrifuges, bacterial shaker and incubator, water purification unit, scales and chemicals. A floor centrifuge (requested in this grant) will also be installed here. Room 2013 of 180 ASF will be set-up for microscopy and computer networking. Renovation of this room will include the demolition of a wall between 2013 and 2014, closing one door, adding a new door that opens to the lab area 2020A-D, and installing shelves. This room will be equipped with a confocal microscope (Olympus FV1000, presently on loan for a limited term so funding to purchase one is requested in this grant) and an upright fluorescence microscope (Zeiss Axiolmager, already in use). In addition, this room will house a computer network and server, also requested in this grant.

During the construction period, ongoing operations will be moved to presently unoccupied space on the same floor. This space is part of the UCSD Stem Cell Program and is reserved for new investigators to be recruited. Therefore, operations will not be discontinued as a result of these proposed renovations. The planned renovation and reconfiguration will make efficient use of space that allows for a greater number of users to be in the facility at the same time (from the present 8 users up to 20 users) with a more ergonomic use of space because related activities can be clustered physically in the arrangement suitable to the protocols being performed.

3. Specifics of Renovation in EBU 1:

In EBU1, rooms 5307, 5311 and 5313 (total 1,875 asf) will be renovated and connected to each other and to adjacent rooms 5315 and 5319 to create an integrated suite totaling 2,775 asf; Room 5307 for Biomaterial Synthesis, room 5311 for Biomaterial Characterization and Instrumentation, and Room 5313 for Bioreactor Design and Fabrication. The suite of rooms 5307 – 5319 will be secured by a corridor door accessed by magnetic card that records user, date and time of passage. Rooms 5307 and 5311 will require the most renovation. Room 5313 will require less extensive renovation. In the future, rooms 5315 and 5319 will be used for tissue engineering research. No major walls will be moved, and the entire suite will be opened up by new openings between all the labs. All equipment used in the Bioengineering Satellite will be or has been purchased with non-federal funds designated by the Dean of Engineering to establish this core as a shared campus resource to attract outstanding recruits in the Bioengineering and other departments in the field of Regenerative Medicine.

a. ROOM 5307 will become a chemistry-enabled BIOMATERIALS SYNTHESIS Laboratory with four fume hoods and specialized polymer synthesis equipment including nanomaterial fabrication. Exhaust systems are available but new runs are needed. Both micro- and nano- solid, gel and fluid materials will be designed and synthesized for use: (1) in the development of functionalized scaffolds for controlling and optimizing the growth and differentiation of hESCs and for engineering replacement tissues; (2) in the fabrication of bioreactors for scale-up of cell production; and (3) in the development of therapeutic delivery vehicles for cell implantation in vivo. Equipment in this room will include a Innotech polymer encapsulator for polymer nanocomposite material synthesis; renovations requested in the proposal will make it feasible to install this equipment in a room for multiple users, with four chemical fume hoods and appropriate benches, shelving, cabinetry, and secure access.

b. ROOM 5311 will become the BIOMATERIALS CHARACTERIZATION AND INSTRUMENTATION Laboratory, a bioengineering research lab for chemical and physical analysis and characterization of biomaterial constructs at the micro and nano scales. This lab will house the Fourier Transform Infrared spectrometer, the gel permeation chromatography (GPC) light scattering detector, and other specialized test equipment (all purchased by UCSD) for characterizing the new materials. There will also be a separate microscope room that can be darkened for a high-speed Laser-Enabled Analysis and Processing (LEAP) platform (Cyntellect). Renovations requested in the proposal are required to install these equipment items in a room for multiple users, with appropriate benches, shelving, cabinetry, and secure access.

c. ROOM 5313 will be reconfigured for BIOREACTOR DESIGN AND FABRICATION. Here new biomaterials will be tested for their +



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Section B -- 1. Laboratory Renovation Plan (continued)

effects on hESC cell growth and differentiation, and used to design and fabricate chambers and bioreactors for controlling and optimizing cell growth for scale-up. Promising approaches to bioreactor systems for tissue engineering applications will be developed in this lab and integrated into the HESCCF in CMME.

d. Renovation to ROOMS 5315 and 5319 are minor and are budgeted only for changes made necessary by nearby renovation and for repair. These rooms are already configured for Tissue Engineering research including microscale tissue engineering.

4. Project Management and Tracking:

Facilities Design & Construction (FD&C) will manage the project. FD&C is the service provider at the University of California, San Diego, charged with the implementation of the Capital Improvement Program. Their responsibilities include project programming, planning, schematic design, design development, construction documents, contract documents, bidding and award of contracts, inspection of construction of buildings and utility systems, and construction administration for all capital improvements. FD&C manages all campus construction projects over \$200,000 and has overseen the construction of more than \$100 million in construction in each of the last five years. The Project Manager, Pnina Goldberg, is a licensed Architect with over 20 years experience in construction and renovation. She will be responsible for managing and tracking renovations in both project locations.

The renovations in CMME and in EBU1 will be managed as two integrated activities. It is anticipated that because the projects are generally of the same scale, they can adhere to one schedule presented in Section B.1. The projects will differ because the HESCCF in CMME will not shut down during construction, and because different renovations are needed in two different buildings with different histories. The project manager will have a scientific officer as point-of-contact for each location. HESCCF Director and grant PI Karl Willert will manage the scientific needs of the HESCCF and renovation in CMME. For Bioengineering, the scientific officer will be Professor John T. Watson.

5. Plans and Schedules for Design, Construction and Installation of Equipment:

Pnina Goldberg is selected as Project Manager because she is an architect with a specialty as a laboratory planner. To enable design to proceed in case this grant is awarded, FD&C plans to begin its selection process for the design team in May 2007 and will select it by mid July 2007. UCSD will require all firms comprising the design team (Executive Architect and subconsultants such as mechanical, electrical, and plumbing engineers) to have experience in laboratory renovations. If the grant is awarded, UCSD will fund an account, the design team will proceed, and the request for CIRM's planning funds will be made.

The progress of the design and construction will be tracked in meetings every two weeks that include the Scientific Officer, the FD&C Project Manager and the Design Team. At completion of preliminary plans, the drawings will be distributed to all interested campus authorities and the PI for review and written acceptance. The same procedure will be followed for working drawings. Construction contract funds will be requested when working drawings are complete and concurrent with the final drawing review so that the construction contract can be advertised for bids shortly after the completion of the final review and upon receipt of the funds from CIRM. UCSD is unable to solicit bids for construction contracts without funding in place. The construction supervisor will be identified upon determination of apparent low bidder.

During construction, progress will be monitored daily by a licensed FD&C Construction Inspector. The Contractor, the Architect, the Inspector, the FD&C Project Manager and necessary others will meet at least weekly. The University's standard contract requires electronic schedules that are cost and man power loaded. The Contractor is only paid for work completed, and any schedule slippage is immediately apparent.

Equipment will be ordered three months before construction completion to allow time for order and delivery. Reimbursement will be requested after delivery of equipment in good working order.

UCSD understands that it is a goal of Proposition 71 that more than 50 percent of the goods and services used in CIRM-supported research is purchased from California suppliers. To achieve this goal, we will purchase from California suppliers, to the extent reasonably possible, the goods and services proposed here. We will provide a clear and compelling explanation in our annual programmatic report if we do not purchase more than 50 percent of goods and services from California suppliers. Purchasing at UCSD follows UCSD PPM 523 that details policies to ensure fairness and good value when purchases are made.

Equipment that must be integrated with lab utilities will be installed during the last few weeks of construction as is common +



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Section B -- 1. Laboratory Renovation Plan (continued)

practice in the University's construction contracts. Punch list and final acceptance activities will also start three weeks before the Contract Completion date in order to allow a timely beneficial occupancy.

Owner generated change orders are minimized by the review and sign-off of the preliminary design and construction documents by all interested Campus Departments including the Users, Fire Marshall and Facilities Management prior to bidding. Contractor initiated change orders are first reviewed by the Design Team (Architect/Engineers) and then the Project Manager prior to any approvals. These are typically kept within the construction contingency.

6. Proposed Contingency Plan in Case of Cost Overruns.

In the event that the project cost at time of bid or during construction exceeds the budget, and that difference cannot be resolved through the selection of bid alternates, Campuswide Funds will fund the shortfall (see CL1-00522-1 Chancellor.pdf).





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Section B. 1. Schedule/Timeline and Drawdown of Funds Table

Provide a realistic schedule and drawdown of funds for completing each activity/milestone, as indicated below.

#	Activity/Milestone	Start Date	Completion or Milestone Date	Amount of CIRM funds to be drawn
1	Grant Award (estimate)		Jul 16, 2007	
2	Request for Planning Funds (10% of Construction Costs)		Jul 17, 2007	\$100,000
3	Prepare Preliminary Plans	Jul 17, 2007	Aug 17, 2007	
4	Approval of PPs		Aug 28, 2007	
5	Prepare Working Drawings	Aug 29, 2007	Oct 24, 2007	
6	Approval of WDs		Nov 9, 2007	
7	Request Construction Contract funds (80% of Construction Costs)		Oct 30, 2007	\$800,000
8	Advertise for Construction Contract	Nov 6, 2007	Nov 20, 2007	
9	Award Construction Contract		Dec 28, 2007	
10	Construction Activities	Dec 28, 2007	May 2, 2008	
11	Completion of Equipment Purchases		Feb 15, 2008	
12	Request Equipment Purchase funds		Feb 18, 2008	1,000,000
13	Beneficial Occupancy		May 2, 2008	
14	Notice of Completion		May 16, 2008	
15	Request Construction Completion Amount (10% of Construction Funding)		May 2, 2008	\$100,000

"Preliminary Plans" (PPs) represent approximately 35 percent of the design effort, or may be considered the product of completing the "Design Development" (DDs) phase of architectural work.

"Working Drawings" (WDs) represent drawings and specifications from which a contractor may determine the full extent of work contemplated in the project for purposes of submitting a bid; may be referred to as completion of "Construction Documents" (CDs) phase of architectural work.



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Section B. 2. Budget

Provide a complete budget for the renovation that includes construction costs, design fees, administration of the project, other costs (i.e. installation of equipment) and a construction contingency (limited to 7-10% of the construction budget). Identify the amount of CIRM funds requested and the matching funds (construction requires 20% matching funds). Provide a complete budget for movable equipment (equipment requires 20% matching funds). **(narrative limited to 3 pages)**

(Note: An Excel spreadsheet can be attached as long as the total submission for this Section is limited to 3 pages)

BUDGET FOR RENOVATION REQUESTED FROM CIRM		
The renovation budget for the two locations includes construction costs of \$793,000. Design fees for Architects, Engineers and planners are \$88,000. Administrative costs for FD&C, gathering bids, inspection, tests, and plans are \$45,000. Thus planning and design and administrative costs are 13.3% of CIRM funds requested for development and renovation, not exceeding the cap of 15% stated in the RFA 07-01. A construction contingency of \$74,000 is budgeted, which is 9.33% of the total construction cost and thus does not exceed the cap of 7-10%. Installation costs are included in Other Construction.		
The following changes are budgeted for the Expansion of the HESCCF in CMME:		
Rooms 2020 A - D - Cell and Molecular Biology Lab (1312 ASF)		
Lab Renovation	\$130,000	
Room 2020 E - Cell culture Facility (450 ASF)		
Lab Renovation	\$91,000	
Room 2020 F - Electrophysiology Unit (100 ASF)		
Add Shelving	\$12,000	
Room 2020 G - Micromanipulation and cell culture room (113 ASF)		
Add Lab Bench	\$4,000	
Room 2020 H - Cell culture room (108 ASF)		
Add Lab Bench	\$4,000	
Room 2013 - Microscope and computer room (180 ASF)		
Lab Renovation	\$52,000	
TOTAL CONSTRUCTION CONTRACT CMM EAST 2,263 ASF	\$293,000	
Past UCSD Renovation Expenditure		\$56,021
The following changes are budgeted for the EBU 1 Bioengineering Satellite:		
Room 5307 - Biomaterial Synthesis (675 ASF)		
Lab Renovation	\$118,000	
Four 8-ft Chemical Fume Hoods	\$75,000	
Room 5311 - Biomaterial Characterization and Instrumentation (600 ASF)		
Lab Renovation	\$132,000	
Room 5313 - Bioreactor Design (600 ASF)		
Lab Renovation	\$111,000	
Rooms 5315 & 5319 - Tissue Engineering (900 ASF)		
minor demo & repair	\$10,000	
TOTAL CONSTRUCTION CONTRACT EBU 1 2,775 ASF:	\$ 446,000	
Engineering Dean's Match, UCSD		\$60,000
Other Construction:		
Install Equipment, Security Hardware & Keying	\$54,000	
CONSTRUCTION subtotal:	= \$ 793,000	
Construction	\$793,000	
Fees: Architect, Engineers, Lab Planner	\$88,000	
FD&C Admin, Inspection, Tests & Plans	\$45,000	
Construction Contingency	\$74,000	
TOTAL RENOVATION REQUEST TO CIRM: \$ 1,000,000		
		TOTAL UCSD RENOVATION MATCH \$116,021



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Section B. 2. Budget (continued)

Total Matching funds of \$833,890 are provided by UCSD. The detail on past and future spending are detailed in an attached spreadsheet titled CL1-00522-1 Match.pdf. Equipment with a value of \$167,869 has been in use in the HESCCF since 4/7/2006.

The renovation match from UCSD is less than 20% of renovation costs requested from CIRM because the equipment match will be used for the necessary 20% match, following the Clarification on Matching Funds issued on March 8, 2007 by CIRM for this RFA. Nevertheless, the \$56,021 UCSD funds used for renovation in the start-up of the HESCCF, and the Engineering Dean's Match of \$60,000 (CL1-00522-1 Seible.pdf) are further indication of UCSD's strong support for research on improved methods for growth and differentiation of hESC.

BUDGET FOR MOVABLE EQUIPMENT

Equipment budget proposed to CIRM

vendor	equipment	cost	date of purchase
BD Biosciences	FACS Aria	\$480,000	2/15/2008
Olympus	FV1000 Confocal microscope	\$280,000	2/15/2008
Olympus, Warner Instr, Apple, others	Electrophysiology unit	\$150,000	2/15/2008
TBD	Floor Centrifuge	\$32,000	2/15/2008
TBD	Biosafety Cabinet	\$14,000	2/15/2008
TBD	Microcentrifuge	\$12,000	2/15/2008
Amaya	Nucleofector electroporator	\$12,000	2/15/2008
TBD	Network Server	\$20,000	2/15/2008

TOTAL MOVABLE EQUIPMENT REQUESTED FROM CIRM \$1,000,000

Equipment budget funded by UCSD

vendor	equipment	cost	date of purchase
McBain Instr	S6D Stereozoom microscope	\$ 5,478	04/07/06
Access Products	2 biosafety cabinets	\$ 12,132	06/30/05
ISC Bioexpress	Eppendorf Centrifuge 5810R	\$ 6,878	11/04/05
ISC Bioexpress	Eppendorf Master Cycler EP	\$ 5,188	11/04/05
Beckman Coulter	Centrifuge	\$22,315	07/27/05
Sanyo E & E Amer	Incubator & freezer	\$44,471	08/03/05
Fischer Scien	MilliQ Water Purification Syst	\$5,286	08/02/05
Karl Zeiss	Zeiss imaging w/5 25a high end	\$66,121	09/21/05

PAST EQUIPMENT MATCH, UCSD \$167,869

Cyntellect	LEAPTM live cell imaging and purification system	\$400,000	to be purchased
TBD	Fourier Transform Infrared (FTIR) spectrometer	\$ 50,000	to be purchased
Viscotek	GPC Light-scattering detector	\$ 50,000	to be purchased
Inotech	IE-500 M/C polymer encapsulator	\$ 50,000	to be purchased

ENGINEERING DEAN'S MATCH, UCSD \$550,000

TOTAL EQUIPMENT MATCH, UCSD \$717,869



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Section B. 3. Budget Summary Table

Complete the budget summary for the use of CIRM funds.

Note: All colored fields contain calculated data. Please do not enter anything in those fields.

Other Project Costs				
Budget Category		Total Budget	CIRM Grant Funds	Institutional Match
Construction Contract Costs		\$ 855,021	\$ 739,000	\$ 116,021
Other Construction Costs (institutional)		\$ 54,000	\$ 54,000	\$ 000
Subtotal Construction		\$ 909,021	\$ 793,000	\$ 116,021
Design Fees		\$ 88,000	\$ 88,000	\$ 000
Administrative Costs		\$ 45,000	\$ 45,000	\$ 000
Construction Contingency		\$ 74,000	\$ 74,000	\$ 000
Total Construction		\$1,116,021	\$1,000,000	\$ 116,021
Movable Equipment		\$1,717,869	\$1,000,000	\$ 717,869
Total Budget		\$2,833,890	\$2,000,000	\$ 833,890
Gross Square Feet	6161	\$ 181.14	\$ 162.31	Const Costs/GSF
Assignable Square Feet	5038	\$ 221.52	\$ 198.49	Const Costs/ASF



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Section B. 4. Institutional Commitment

Provide a detailed description of the amount and source of matching funding for each request that requires matching funds. The requirement of matching funds can be satisfied if the institution can document funds, excluding other grant funds, committed to similar projects (i.e., renovation of lab space and equipment purchase) after January 1, 2005. Detail the use of the space after the three year period is completed. (narrative limited to 2 pages)

1. AMOUNT AND SOURCE OF MATCHING FUNDS

UCSD has invested significant resources to jumpstart an interdisciplinary program to enable investigators to conduct research projects on human embryonic stem cells (hESC). Federal funding restrictions on this research have created significant need amongst investigators for space and funding free of these limitations. In response to this need at UCSD and the need for greater collaboration between the partners of the San Diego Consortium for Regenerative Medicine, the UCSD Chancellor has made the development of the UCSD Stem Cell Program a top priority, as evidenced by the commitment of laboratory space and financial support of \$1,200,000 since January 1, 2005 to this effort. This initial support has kicked off hESC research at UCSD, initiated multiple interdisciplinary research projects across campus, and helped seven investigators at UCSD secure CIRM SEED grants. In addition, three investigators' Comprehensive grants are recommended for funding. To date, UCSD has invested \$167,869 in equipment and \$56,021 in renovations (both itemized in the attachment CL1-00522-1 match.pdf) to create the Human Embryonic Stem Cell Core Facility (HESCCF) in Cellular & Molecular Medicine East (CMME) building. The UCSD Stem Cell Program labs and offices occupy approximately 12,000 ASF of the second floor of CMME, and surround the HESCCF with labs and workspace for stem cell investigators. This space was designated by the Vice Chancellor for Health Sciences as UCSD Stem Cell Program space to encourage interdisciplinary interaction among researchers from various fields. An additional \$610,000 has been committed to the establishment of a satellite laboratory to be located in the Engineering Building EBU1. This commitment is documented in a letter from the Dean of the Jacobs School of Engineering Dr. Frieder Seible (attachment as file titled CL1-00522-1Frieder.pdf). The total commitment of \$833,890 is in excess of the 20% matching funds required for the \$2,000,000 of equipment and renovations requested in this Shared Research Laboratory grant. In addition to this financial support, UCSD has made the establishment, development and expansion of the Stem Cell Program a top priority, as documented in the letters by Program Director Dr. Lawrence Goldstein and Vice Chancellor Dr. Arthur Ellis (attachments CL1-00522-1Goldstein.pdf and CL1-00522-1Chancellor.pdf), backing the scholarly and intellectual support with funds for salaries of technical personnel, and dedication of administrators and educators in stem cell biology, medicine, engineering, and ethics.

2. USE OF SPACE BEYOND THREE YEARS

a. HESCCF in CMME: There are three main functions that this facility fulfills: (i) teaching of basic hESC methods, either in 1:1 training sessions or larger classes (such as the course CMM-251 offered Jan-March, 2007), (ii) providing laboratory space that is exclusively supported by non-federal funding sources so that research on non-approved cell lines can be performed, and (iii) developing and making available novel technologies for the genetic manipulation of hESCs. As investigators at UCSD master basic methods for hESC research, the need for training will diminish. In addition, in case federal restrictions on hESC research are relaxed or lifted, some investigators may elect to conduct this research in their own laboratories rather than in the HESCCF. UCSD is working to refine and reform policy and administrative procedures that will allow individual investigators who initiated research activities in the shared research laboratory to transfer aspects of their experiments back to their own laboratories. In contrast, the need for developing novel methods for the manipulation of hESCs as proposed and described in Part 1 of this grant will continue. In particular, many of the technologies to be developed and improved require significant equipment and space resources that most individual laboratories are not able to acquire and maintain. Specifically, robotic manipulation, cell sorting and electrophysiological analysis of hESCs will be made available to investigators at UCSD. As such the CMME lab will act as a staging area for interdisciplinary projects requiring novel research resources and capabilities. Financial support beyond three years for this facility is described below in Section 3 and will be achieved by billing to recover costs (recharge) and philanthropic support.

b. EBU 1 Bioengineering Satellite: The scientific goals of this facility include the synthesis of novel biomaterials, their characterization, and their use in customized bioreactors and tissue engineering applications. Achieving these goals is of fundamental importance in translating the basic science of hESCs to therapeutic uses. For example, technologies for the encapsulation of cells and the manufacture of novel materials and cellular micro-arrays will greatly accelerate the rate at which scientific discoveries are made. Design and development of such technologies will be in high demand by many investigators in the physical and life sciences. The unique capacities of this facility will attract other non-engineering faculty and projects. Similar to the CMME facility, the EBU 1 Bioengineering Satellite will be supported by billing to recover costs (recharge) and philanthropic support.



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Section B. 4. Institutional Commitment (continued)

3. FINANCIAL SUPPORT BEYOND THREE YEARS

UCSD will continue to expand its stem cell program by two mechanisms: (i) recruiting new faculty using allocations of University positions to this area of science (e.g., Bioengineering will be recruiting six new faculty members, two of which are pending) and (ii) attracting existing faculty members from related fields to initiate programs in this area. This combination will place high demand on the shared research laboratories at CMME and EBU1 and the technologies that will be developed and improved at these locations. To support these facilities for new recruits and existing faculty we have developed a working business plan that will sustain the shared research laboratories at CMME and EBU1 after the first three years. This plan consists of recovering operating costs through recharge and philanthropic support.

a. Recovering Costs (Recharge): As mentioned in our Part I application, UCSD has experience developing fair rates and billing users of core facilities to recover operating costs. A recharge system, consistent with Federal and State policies, has already been established at CMME and is being used to recover costs incurred when training courses are provided and when individual investigators conduct trial hESC experiments in the CMME facility. A similar recharge mechanism will be established at the EBU1 facility as soon as it is operational.

b. Philanthropic Support: UCSD and its departments involved in the stem cell program have developed strong relationships with the community which have led to significant financial support from various private foundations. Within the past year, foundations such as the W. M. Keck Foundation and anonymous donors have provided funding to the stem cell program in excess of \$1.5 million. In addition, we are seeking grants or gifts for seed funding of pilot projects to demonstrate proof-of-concept with preliminary data. Results of the seed-funding projects should lead to new grant awards that will provide funds to the shared research labs in compliance with federal and state policies. Other philanthropic collaborations may be established with a scientist/philanthropist who is interested in contributing intellectually and financially to the stem cell program at UCSD. Efforts are ongoing to develop a Prospectus that can be customized to various foundations and individuals with an interest in investing in the UCSD Stem Cell Program to further encourage gifts. Finally, the formation of an Industry and Friends Advisory Board (IFAB) has been initiated to advise on policies, research opportunities and contribute to an aggregated EBU1 Satellite gift fund. Several companies have expressed interest in participating and providing unrestricted advice and annual support to the proposed EBU1 Bioengineering Satellite.



CIRM Shared Research Laboratory Information Form – Part Two

Section C. Stem Cell Techniques Course (if applicable)

Based on the information provided in Part One of the application describing the course, include a justification of the additional space required and additional equipment requested, if any. Include additional square footage and provide as an attachment one 11x17 page of the proposed floor plan of the renovated space. (narrative limited to 1 page)

Limit narrative to visible field area.



CIRM Shared Research Laboratory Information Form – Part Two

Section C. 1. Schedule and Drawdown of Funds Table (if applicable)

Provide a realistic schedule and drawdown of funds for completing each activity/milestone, as indicated below.

#	Activity/Milestone	Start Date	Completion or Milestone Date	Amount of CIRM funds to be drawn
1	Grant Award (estimate)			
2	Request for Planning Funds (10% of Construction Costs)			\$ 000
3	Prepare Preliminary Plans			
4	Approval of PPs			
5	Prepare Working Drawings			
6	Approval of WDs			
7	Request Construction Contract funds (80% of Construction Costs)			\$ 000
8	Advertise for Construction Contract			
9	Award Construction Contract			
10	Construction Activities			
11	Completion of Additional Equipment Purchases			
12	Request Additional Equipment Purchase funds			
13	Beneficial Occupancy			
14	Notice of Completion			
15	Request Construction Completion Amount (10% of Construction Funding)			\$ 000

"Preliminary Plans" (PPs) represent approximately 35 percent of the design effort, or may be considered the product of completing the "Design Development" (DDs) phase of architectural work.

"Working Drawings" (WDs) represent drawings and specifications from which a contractor may determine the full extent of work contemplated in the project for purposes of submitting a bid; may be referred to as completion of "Construction Documents" (CDs) phase of architectural work.

"Additional Equipment" represents equipment to be used for the Stem Cell Techniques Course.



CIRM Shared Research Laboratory Information Form – Part Two

Section C. 2. Budget (if applicable)

Provide a complete budget for the additional renovation that includes construction costs, design fees, administration of the project, other costs (i.e. installation of equipment) and a construction contingency (limited to 7-10% of the construction budget). Identify the amount of CIRM funds requested and the matching funds (construction requires 20% matching funds). Provide a complete budget for additional movable equipment (equipment requires 20% matching funds). **(narrative limited to 3 pages)**

(Note: An Excel spreadsheet can be attached as long as the total submission for this Section is limited to 3 pages)



CIRM Shared Research Laboratory Information Form – Part Two

Section C. 3. Budget Summary Table (if applicable)

Complete the budget summary for the use of CIRM funds.

Note: All colored fields contain calculated data. Please do not enter anything in those fields.

Other Project Costs				
Budget Category		Total Budget	CIRM Grant Funds	Institutional Match
Construction Contract Costs				
Other Construction Costs (institutional)				
Subtotal Construction				
Design Fees				
Administrative Costs				
Construction Contingency				
Total Construction				
Additional Movable Equipment				
Total Budget				
Gross Square Feet		\$ 0.00	\$ 0.00	Const Costs/GSF
Assignable Square Feet		\$ 0.00	\$ 0.00	Const Costs/ASF



CIRM Shared Research Laboratory Information Form – Part Two

Section D. Signature Page

Complete, save, and print Part Two of the Shared Research Laboratory Grant Information.

Submit electronic application as an email attachment to laboratory@cirm.ca.gov no later than 5:00pm PST on March 16, 2007.

Mail* the original executed Part Two application and five (5) copies to:

Shared Research Laboratory Grant Application

California Institute for Regenerative Medicine

210 King Street

San Francisco, CA 94107

***Mailing must be postmarked no later than March 16, 2007.**

Applications will not be accepted after these deadlines.

Project Start Date Jul 16, 2007

Construction Start Date Dec 20, 2007

Occupancy Date May 9, 2008

Total Part Two Funds Requested for Shared Laboratory Space \$2,833,890

Total Part Two Funds Requested for Stem Cell Techniques Course

Total Capital Funds Requested \$1,116,021

Facilities Contact

Dr. Jennifer B. Braswell
UCSD Stem Cell Program Administrator
School of Medicine Dean's Office Stem Cell Program
University of California, San Diego
9500 Gilman Drive, 0695
La Jolla, CA 920930695
(858) 534-2412
jbraswell@ucsd.edu

Authorized Organizational Official

Date

Print Name

Title

Program Director

Date

Print Name

Title



CIRM Shared Research Laboratory Information Form – Part Two Supplement

Project Information

Application Number

Program Director Name:

Historical Performance

Provide information on past performance for 3 projects.

	Project 1	Project 2	Project 3
Brief Project Title	Pathology Lab Renovation,	IMG 4 - Dr. DeMaio Lab Renovation,	Bioengineering NIH Facilities,
Original Budget (Total project cost)	\$ 939,377	\$1,866,000	\$1,392,000
Final project cost	\$ 927,208	\$1,124,639	\$1,384,126
Scheduled Completion Date	Sep 3, 2004	Sep 4, 2006	Oct 1, 2004
Actual Notice of Completion Date	Oct 12, 2004	Nov 22, 2006	Dec 31, 2004
Gross Square Feet involved	9,530	5,500	5,300
Assignable Square Feet involved	8,600	5,360	4,266
Approximate number of change orders	4	5	7
Value of all change orders & claims	\$ 138,644	\$ 113,639	\$ 23,778
Type of construction management	Design-Bid-Build	Design-Bid-Build	Design-Bid-Build

Laboratory Alteration Projects

Please enter the number of laboratory alteration projects completed by the applicant in the past 2 years (in the range of \$1-5 million in project cost), and the approximate total dollar value that these projects represent.

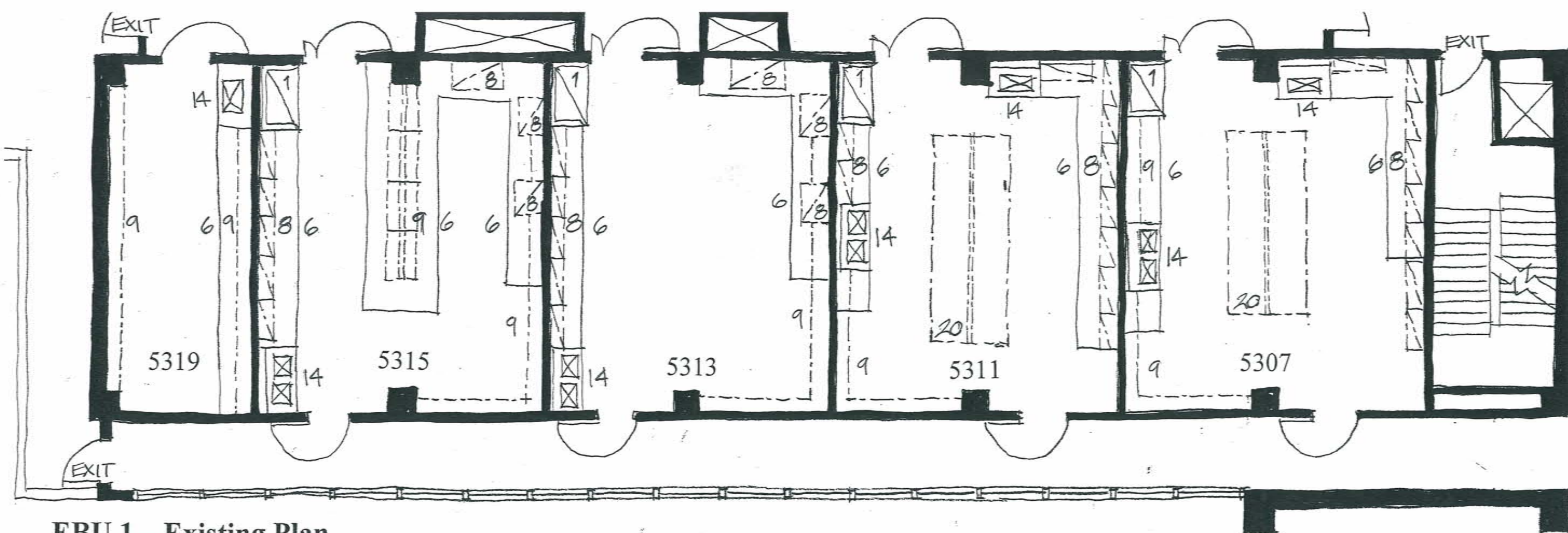
Total Laboratory Alteration Projects

Approximate Total Value

Limit Budget Justification to visible field area.

Matching funds from UCSD in support of CIRM application CL1-00522-1 since Jan 1, 2005

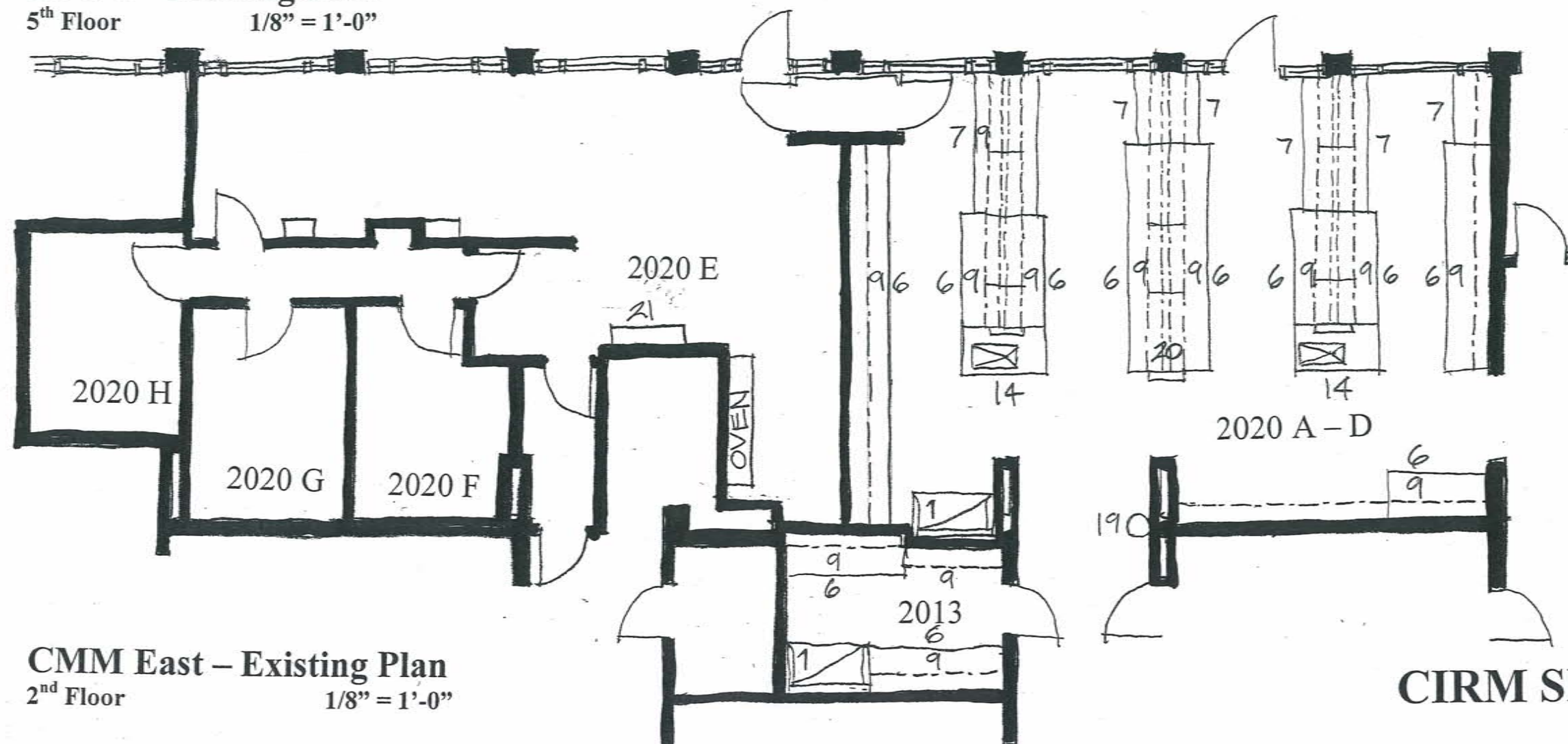
vendor	equipment	cost	date of purchase
McBain Instruments	S6D Stereozoom microscope and focus drive cc	\$5,478	4/7/06
Access Products int'l	2 biosafety cabinets	\$12,132	6/30/05
ISC Bioexpress	Eppendorf Centrifuge 5810R	\$6,878	11/4/05
ISC Bioexpress	Eppendorf Master Cycler EP	\$5,188	11/4/05
Beckman Coulter	Centrifuge	\$22,315	7/27/05
Sanyo E & E America	Incubator & freezer	\$44,471	8/3/05
Fischer Scientific	MilliQ Water Purification System	\$5,286	8/2/05
Karl Zeiss	Zeiss imaging w/5 25a high end slssup	\$66,121	9/21/05
	PAST EQUIPMENT MATCH, UCSD	\$167,869	
Cyntellect	LEAPTM live cell imaging and purification sys	\$400,000	to be purchased
TBD	Fourier Transform Infrared (FTIR) spectromete	\$50,000	to be purchased
Viscotek	GPC Light-scattering detector for EBU1 Rm 53	\$50,000	to be purchased
Inotech	IE-500 M/C polymer encapsulator for EBU1 Rr	\$50,000	to be purchased
	FUTURE EQUIPMENT MATCH, UCSD	\$550,000	
	TOTAL EQUIPMENT MATCH, UCSD	\$717,869	
vendor	item	cost	date
PPS UCSD	technical safety services	\$315	1/17/07
PPS UCSD	hang several items	\$330	11/30/06
PPS UCSD	install 4 CO2 tank brackets	\$112	8/30/05
PPS UCSD	install new 110 volt 20 amp circuits	\$7,027	7/30/05
PPS UCSD	removing shelving behind -80 c upright	\$157	7/31/05
PPS UCSD	install vacuum to 2 hoods	\$1,771	7/31/06
PPS UCSD	relocate receptacles to fee lab equipment	\$3,887	10/31/06
PPS UCSD	keys for security	\$42	12/15/05
Ikea	Stem Cell labs interaction space	\$1,711	11/2/06
PPS C-E-I	additional card readers to SC suite	\$28,000	1/27/07
PPS UCSD	renovations to stem cell animal surgery	\$12,669	3/5/07
	PAST RENOVATION MATCH, UCSD	\$56,021	
CL1-00522-1 Seible.pd	ENGINEERING DEAN'S MATCH, UCSD	\$60,000	
	TOTAL UCSD MATCH	\$833,890	



EBU 1 – Existing Plan

5th Floor

1/8" = 1'-0"



CMM East – Existing Plan

2nd Floor

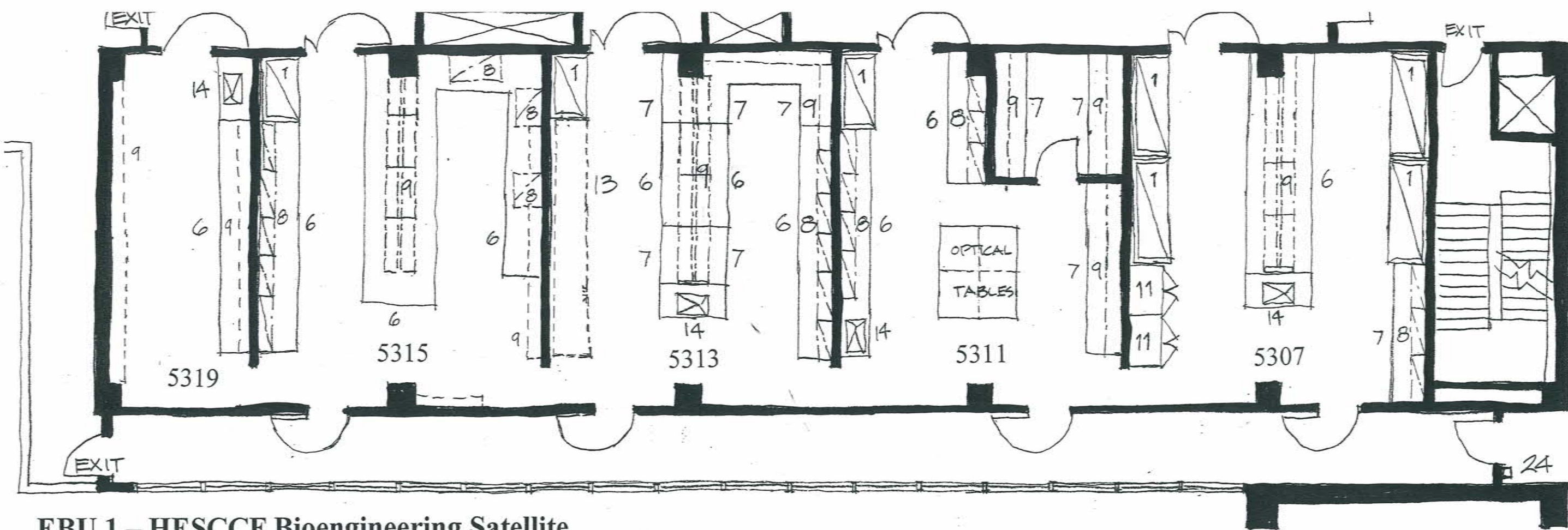
1/8" = 1'-0"

FURNISHINGS

- | | |
|--------------------------------------|-------------------------------|
| 1. Chemical Fume Hood | 13. Equipment Space |
| 2. Biological Safety Cabinet | 14. Laboratory Sink |
| 3. Radioisotope Hood | 15. Cupsink |
| 4. Vented Workstation | 16. Processing Sink |
| 5. Snorkel Exhaust | 17. Cylinder Rack |
| 6. Laboratory Bench, Standing Height | 18. Gas Cabinet |
| 7. Laboratory Bench, Sitting Height | 19. Safety Shower/Eyewash |
| 8. Wall Cabinet | 20. Overhead Service Carrier |
| 9. Adjustable Shelves | 21. Autoclave |
| 10. Reagent Shelves | 22. Moveable Laboratory Table |
| 11. Tool Storage Cabinet | 23. Wire Shelving |
| 12. Vented Flammable Storage Cabinet | 24. Glassware Dryer |

CIRM Shared Research Laboratory

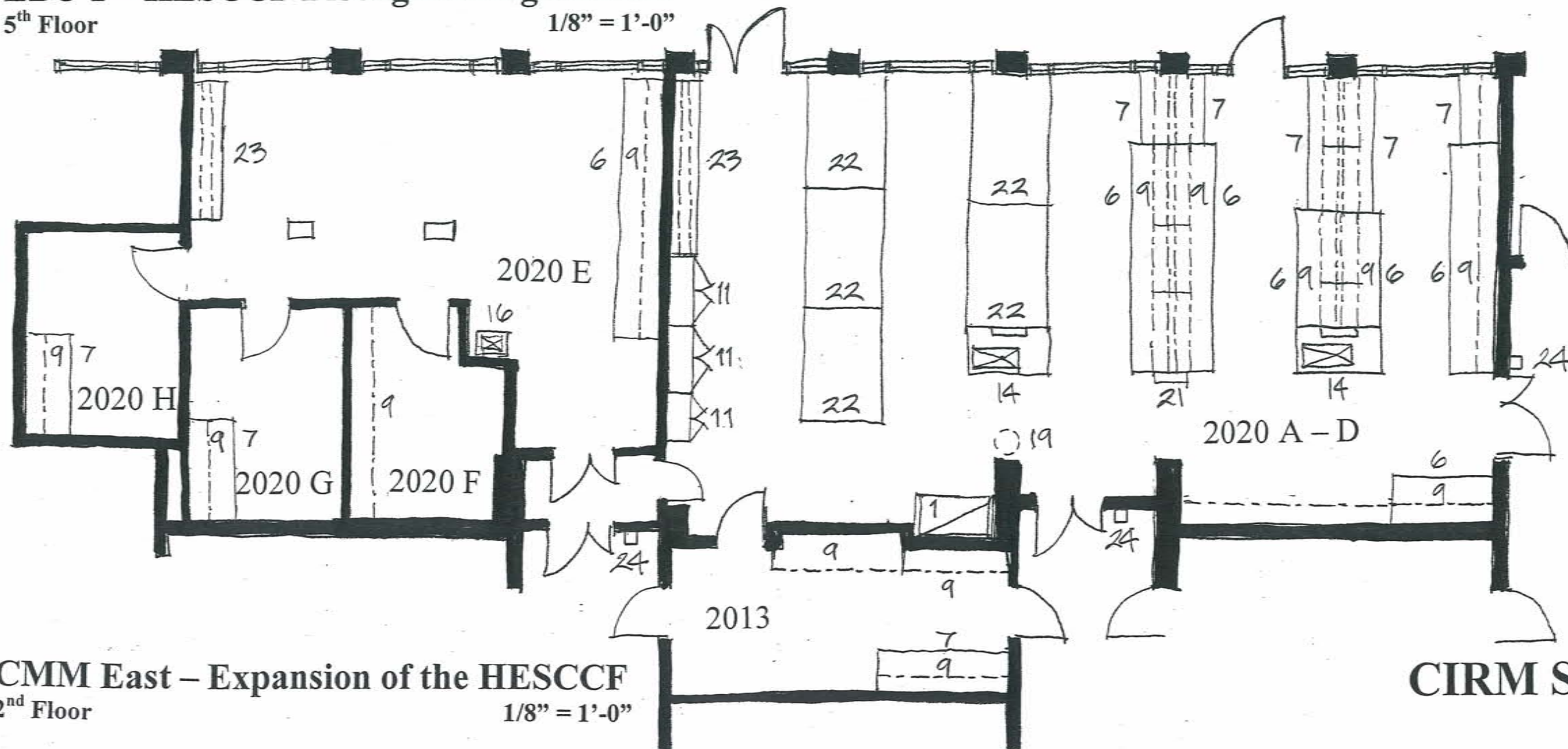
16 March 2007



EBU 1 – HESCCF Bioengineering Satellite

5th Floor

1/8" = 1'-0"



FURNISHINGS

- | | |
|--------------------------------------|-------------------------------|
| 1. Chemical Fume Hood | 13. Equipment Space |
| 2. Biological Safety Cabinet | 14. Laboratory Sink |
| 3. Radioisotope Hood | 15. Cupsink |
| 4. Vented Workstation | 16. Processing Sink |
| 5. Snorkel Exhaust | 17. Cylinder Rack |
| 6. Laboratory Bench, Standing Height | 18. Gas Cabinet |
| 7. Laboratory Bench, Sitting Height | 19. Safety Shower/Eyewash |
| 8. Wall Cabinet | 20. Overhead Service Carrier |
| 9. Adjustable Shelves | 21. Pipe Drop Enclosure |
| 10. Reagent Shelves | 22. Moveable Laboratory Table |
| 11. Tall Storage Cabinet | 23. Wire Shelving |
| 12. Vented Flammable Storage Cabinet | 24. Access Control |

CMM East – Expansion of the HESCCF

2nd Floor

1/8" = 1'-0"

CIRM Shared Research Laboratory

16 March 2007

Appendix A

Application: CL1-00522-1

Title: Enhancing Facilities for Genetic Manipulation and Engineering of Human Embryonic Stem Cells at UCSD

Public Abstract:

Human embryonic stem cell (hESC) research promises to be of fundamental importance in the study and treatment of various human diseases, including cancer, neurodegenerative disorders and organ failure. In recent years we have made great strides in advancing hESC research as documented by the large number of successful, high-impact laboratories and breadth of research projects here. In addition, we are situated among several other first-rate institutions, all of which have joined in an unparalleled research environment for hESC research.

Since the creation of the California Institute for Regenerative Medicine, we have devoted both space and financial resources to promote hESC research. Our institutional commitment has as a cornerstone the creation of a core facility for hESC research to foster and promote hESC research at this and surrounding institutions. To date the facility has served to (1) train scientists in the basic methodologies to conduct hESC research (2) facilitate hESC research for many investigators, both established and beginning scientists, and (3) provide a "safe haven" that is sheltered from any federal funding sources thus allowing unimpeded hESC research. However, due to the high demand on space, equipment and technologies, the present facilities are insufficient to sustain the ongoing and proposed research projects.

We therefore request funding from CIRM to expand this facility and enhance its scientific output and creativity. In addition to providing expanded adequate facilities for our many scientists and clinicians embarking on hESC research, our major scientific goals for the shared research laboratory are (1) the development of protocols for the generation of genetically marked hESC lines, (2) the improvement of protocols for derivation of mature cell types, with an emphasis on neural differentiation, and (3) the development of novel surfaces and materials for the large scale growth and production of hESCs. These goals synergize the expertise of several departments, including the departments of Bioengineering, Materials Science, Biological Sciences, Pharmaceutical Sciences and the School of Medicine.

The support provided by this shared research grant will allow our institution to enhance our interdisciplinary stem cell program so that we may accelerate our goals of improving health and conquering diseases through regenerative medicine.

Statement of Benefit to California:

Human embryonic stem cells (hESC) provide the "raw material" that can potentially provide mature cell types for developing new disease therapies. Understanding how to control the growth and differentiation of hESCs, however, requires extensive research. Unfortunately, federal restrictions limit progress.

In 2005, our institution established a shared research laboratory which has provided essential training and has made space and technologies available to conduct hESC research without federal restrictions. However, the needs of researchers are beginning to exceed our limited resources. CIRM funding will allow expansion of the existing facility and the development of key technologies essential to ongoing and proposed projects at this and other institutions throughout California.

The proposed expansion includes creation of a satellite with emphasis on bioengineering technologies needed to develop therapeutic delivery vehicles and grow tissue engineered implants from hESC-derived cells. This satellite will leverage our international leadership in cell and tissue engineering and significant experience in translational research and technology transfer. The unique strength of interdisciplinary partnerships will accelerate translation of new scientific discoveries to clinical practice and new therapeutic agents that will benefit California's healthcare system and global competitiveness.

CIRM funding will be enhanced by the investment already made by our institution in hESC research. The proposal integrates scientific need with the proposed expansion in cell biology and engineering abilities. Our request comes in direct response to needs of productive, experienced researchers in a context where professors, doctors, ethicists, social and political scientists can contribute to advancements in service of human health. Our context provides the teaching environment that will help engage California's best young minds, and impart the latest discoveries to our students.